

REPORT
OF THE
CANADIAN ARCTIC EXPEDITION
1913-18

VOLUME III: INSECTS

PART E: COLEOPTERA

Forest Insects, including Ipidæ, Cerambycidæ, and Buprestidæ	J. M. Swaine
Carabidæ and Silphidæ	H. C. Fall
Coccinellidæ, Elateridæ, Chrysomelidæ, and Rhynchophora (excluding Ipidæ)	C. W. Leng
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J. de LABROQUERIE TACHÉ
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1919

Issued December 12, 1919.

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The Coleoptera collected by the Canadian Arctic Expedition, 1913-18.

FOREST INSECTS.

The Families IPIDAE, CERAMBYCIDAE and BUPRESTIDAE.

By J. M. SWAINE.

Chief, Division of Forest Insects, Entomological Branch, Department of Agriculture, Ottawa.

The forest insect collection was made principally at "Camp creek" and along the adjoining river banks, on the east side of the Coppermine river, Northwest Territories, just below Sandstone rapids. Only a few isolated specimens were obtained in other localities. Along the river near Sandstone rapids is the northern limit of forest trees and to examine this Mr. Johansen made a special trip of over 50 miles. The trees here are white spruce, mostly stunted and growing in a very open stand, as is well shown in the accompanying illustration. Plate I. The examination was made in February at a temperature of about 50 degrees below zero. In addition to pieces of bark containing many dead beetles a section of a trunk and part of a dying branch were brought back by Mr. Johansen.

A large number of trees were dead or showed dead and dying parts, and a superficial examination of these suggested that many of the dead standing trees had been killed by the bark-beetles whose galleries were extremely abundant on the wood surface wherever this was laid bare.

Of the bark-beetles a species of *Dendroctonus* was found at the base of one dead tree; *Polygraphus rufipennis* Ky. and *Pityophthorus nitidus* Sw. apparently occurred in abundance, while an undescribed species of *Carphoborus* was probably less numerous and is represented in the collection by only two specimens exposed in a tunnel in one of the specimen sticks while removing the bark in the laboratory. *Polygraphus rufipennis* and *Pityophthorus nitidus* were the most numerous in the dead trees and occurred throughout the trunk. Usually they were well chitinized and dark in colour. These species were found chiefly in timber of medium size, rarely in very young or very old trees. The *Dendroctonus* beetles came entirely from the base of one large spruce which also carried the two smaller species (*Polygraphus* and *Pityophthorus*) in the upper part. There were many adult *Dendroctonus* beneath the bark, chiefly in cells in a compressed layer of frass lying upon the surface of the wood. They were all very light in colour and had died before maturity. Mr. Johansen believes that all these beetles were dead when he collected the wood. The cause of their death was not apparent, but was probably due to adverse weather conditions.

Cerambycid tunnels cut by larvæ of several species were also abundant in these dead trees, and had apparently been responsible, in part, for their death. The larger trees were usually quite without bark or had retained it only in patches, particularly about the base of the trunk. The wood surface showed many surface tunnels of cerambycid larvæ, and although no living larvæ were found, several dead adults of *Mercus proteus* Ky. were taken from these tunnels beneath the bark. Larval skins were found and dead larvæ which had apparently been killed by parasitic hymenoptera whose cocoons, usually empty, were found beside them. The galleries of wood-boring cerambycid larvæ were also numerous in these trees, and several dead adults were taken from the tunnels by Mr. Johansen.

In his field notes Mr. Johansen says of these tunnels: "The origin of this burrow could always be traced to a wound on the tree, a branch broken off by storms, a fire wound, or bare patch on which the bark had been killed by bark-beetles."

Many of the living trees were examined by Mr. Johansen, and although the young trees and those growing in a close stand were but little affected by insects, numbers of the others had dead and dying parts attacked by bark-beetles or cerambycid grubs.

Dendroctonus was not found at all in these living trees and the tunnels of *Polygraphus* and *Pityophthorus* were less numerous than in the dead timber just described. The cerambycid larvæ appeared to be more destructive. Trees were found with the top dead and the base sound, with fresh cerambycid tunnels in the area between the dead and the healthy wood and extending down into the latter. Many of these tunnels were apparently confined to the inner bark and surface of the wood, while others were started on the wood surface and extended deep into the wood itself.

From the surface tunnels six larvæ were taken, varying in length from 6 mm. to 20 mm. These were kept frozen for eventual rearing; but when thawed out in May, 1916, only two (10 mm. and 15 mm. long) were alive, and these died later before transforming. Dead adults of *Merium proteus* Ky. were found in pupal cells at the ends of these surface tunnels, or in exit tunnels leading from them, so that this species was apparently responsible. Many empty hymenopterous cocoons were found in these tunnels beneath the bark. Mr. Johansen says: "often I would find, instead of the cerambycid larva and adjacent to the larval skin, the cocoon of the parasitic hymenopter; these cocoons were empty or contained dead pupæ, excepting one which held a living larva."

The tunnels extending into the wood were of two sizes and doubtless made by distinct species. The larger of the two was like those in the dead trees already described from which adults of *Xylotrechus undulatus* Say were taken. Only two living larvæ of this wood borer were found; these were lying frozen stiff in the inner ends of the burrows. These *Xylotrechus* tunnels always originated at a wound or other exposed surface. They lie on the outer surface for a short distance and are there filled with boring dust, but extend later deep into the wood, eventually becoming longitudinal; there was practically no boring dust in the part of these uncompleted tunnels lying below the wood surface. This species was also heavily parasitized. In the ends of the larval galleries Mr. Johansen often found, instead of the beetle larva, an empty cocoon of a hymenopterous parasite, and the large number of these, together with the scarcity of the cerambycid larvæ, indicated that the parasites were exerting effective control.

Several sawfly larvæ were using these wood tunnels as a winter retreat. They are discussed elsewhere in the reports of this expedition.

The smaller wood tunnels just referred to were cut by *Neoclytus muricatus* Ky. One dead adult of this species was removed from a tunnel below the wood surface after the material reached our laboratory. These tunnels, in so far as represented in the collection, are on a dead stub projecting from a branch still living when it was collected, but containing tunnels of the *Xylotrechus*.

In closing his field notes Mr. Johansen states that forest insects, including bark-beetles and cerambycid larvæ, have caused serious and extensive injury to the white spruce, even in that region, practically the northern limit of trees on the Coppermine River. He considers that those insects had killed the majority of the numerous dead trees he saw in that locality; and he suggests that the injuries to the most northern trees previously ascribed by Richardson and others to fires and unfavourable climatic conditions may have been really caused by similar insect outbreaks.

Family IPIDAE (Scolytidae).

Four species of this family were taken by Mr. Johansen in white spruce on the Coppermine river in latitude 67° 30', and another in hemlock bark at Latouche, Alaska.

Genus *Dendroctonus* Erich.

Erickson, Weig., Archiv., 1: 52, 1836.

Dendroctonus johanseni, n. sp.

Plate II, figure 6.

Length 7 mm.; width 3 mm.; colour yellowish brown (immature); rather abundantly clothed with reddish hairs of moderate length; closely allied to *punctatus* Lec.

The head has the front convex, broadly transversely impressed towards the epistoma, coarsely, closely irregularly rugosely punctured and hairy; the dorsal process of the epistoma with the sides oblique, not attaining the epistomal margin, followed behind by a short, acute, median, longitudinal carina; the vertex with the longitudinal line impressed; the eyes narrow, wider above; the antennal club slightly longer than wide, the first segment nearly as long as the rest united.

The pronotum wider than long, slightly narrower than the elytra, the sides nearly straight on the caudal two-thirds narrowed from the hind angles constricted in front on the sides and dorsum bisinuate on the front margin with wide, oblique, impressions behind the middle; moderately closely and deeply punctured, the punctures irregular, of medium and small sizes, closer on the sides; with a narrow, acute, median carina from the base nearly to the front margin clothed with subrecumbent, short, reddish hairs.

The elytra one and one-half times as long as wide; the striae impressed moderately throughout more strongly towards the suture and on the sides; the striae punctures rather coarse, not deep, rather close, smaller at the base, very little reduced in size on the declivity; the interspaces moderately convex, hardly wider or sometimes narrower than the striae confusedly roughened with acute granules, moderate in size, becoming more numerous, larger, transverse asperities at the base, and sparse and acute behind; the larger granules uniseriate towards the declivity, reduced in size upon the declivital face with irregular small, feebly granulate punctures on the declivital interspaces; the granules smaller and the punctures more numerous on the lateral interspaces than on the disc; the suture wider with the granules confused throughout; the punctures of the declivital striae distinct, almost as large as upon the disc; rather sparsely clothed throughout with long, erect, reddish hairs longer upon the declivity. The ventral surface finely granulate punctate. The proepisternal area distinctly moderately punctured, not strongly granulate.

The male declivity is brightly polished with the striae punctures somewhat smaller.

Type No. 152, Sandstone rapids, Coppermine river, Northwest Territories, F. Johansen, collector; Feb. 15, 1915, 2510 Host, *Picea canadensis*.

This species together with *micans*, of Europe, and *punctatus* Lec., of the Eastern States, forms a sharply isolated group, distinguished by the coarse striae punctures of the elytral declivity. It is closely allied to *punctatus* Lec. but appears to be distinct. The pronotal carina is barely indicated in *punctatus*, the elytral striae are only feebly impressed on the disc, the striae punctures smaller and the elytral interspaces wider than the striae and less coarsely granu-

late than in Arctic species. *D. punctatus* Lec. has been recorded from West Virginia, New York, and Pennsylvania, but has apparently never been taken in Eastern Canada.

Described from about sixty immature adults, taken by Mr. Johansen, dead, in the dried bark at the base of a large dead tree, in February. The beetles had evidently been dead sometime and were brittle, so that many are in poor condition. Mr. Johansen considers these beetles the primary cause of the death of the tree. It appears that some agency, probably abnormal weather conditions, had killed the broods that he found before they emerged from the bark.

Genus *Carphoborus* Eichh.

Eichhoff, Berl. Ent. Zeit., 8: 27, 1864.

Carphoborus andersoni, n. sp.

Plate II, figure 1.

Length, 2.5 mm.; width, 1 mm.; colour, pale reddish (immature).

DESCRIPTION OF THE FEMALE: The head has the front flattened and densely clothed with a brush of rather short yellow hairs; the antennæ slender, the club longer than wide.

The pronotum is slightly wider than long, with the sides arcuately narrowed from base to apex, only feebly constricted in front; the front broadly rounded; the disc closely and deeply but not coarsely punctured, the median line very faint; the pubescence very small, scale-like, not concealing the surface.

The elytra are elongate, the sides subparallel, broadly rounded behind; the bases very strongly elevated and rugose as usual; the striæ distinctly impressed, as wide as the interspaces, the stria punctures coarse and closely placed; the interspaces convex, feebly granulate, clothed with abundant rather slender pale scales which do not entirely hide the surface; the declivity with the 1st interspace but little more elevated than the 2nd and only feebly granulate, the 2nd interspace convex, nearly smooth, narrower behind; the 3rd interspace rather strongly elevated and armed with 5 or 6 rather coarse acute serrations; 5th and 7th interspaces united in a rather broad curve slightly elevated behind and together bearing 3 or 4 acute serrations. This species will go in my key, Dom. Ent. Br. Bull. 14, pt. 2, p. 57, under AA, BB, but is widely separated from *bicristatus* and *bifurcus* by the large size, coarse declivital serrations, less elevated declivital alternate interspaces, and characters of the front.

Type No. 153, Sandstone rapids, Coppermine river, Northwest Territories, F. Johansen, collector; Feb. 15, 1915; 1 paratype (a few fragments); lot 2908. Host, *Picea canadensis*.

One set of tunnels was found in a white spruce limb about one inch in diameter. The nuptial chamber is 6 mm. in diameter with the entrance tunnel indicated and three egg-tunnels; one of these is possibly complete, 6 cm. long, 1 mm. wide, with 28 egg-niches and larval mines developed from 16 of these. The second egg-tunnel is 1 cm. long, with 3 egg-niches cut, and the third tunnel is only started. The egg-niches are small and alternately arranged. The mines are probably not completed; the longest is slightly more than 2 cm in length. Some are moderately elongate and some widen very rapidly. All are filled with white boring dust mixed with red excrement. The species had overwintered as immature larvæ and two young immature adults. The stick was collected in February, 1915.

Genus **Polygraphus** Erich.

Erichson, Weig. Archiv., 1:57.

Polygraphus rufipennis Ky.

Plate II, figure 2.

Kirby, Faun. Bor. Amer., 4:193, tab. 8, fig. 2, *Apate* (*Lepisomus*) 1837, *Apate* (*Lepisomus*) *nigriceps* Ky. Kirby, loc. cit. 194, *Polygraphus saginatus* Mannh. Mannerheim, Bul. Mosc., 237, 1853; *Apate* (*Lepisomus*) *brevicornis* Ky. Kirby, loc. cit., 194, (Probably not *rufipennis*, but injured and unrecognizable.)

A stout cylindrical species, clothed with scales. Length, 2 mm. to 3 mm., colour black, elytra very dark piceous.

DESCRIPTION OF THE FEMALE.—The head has the front flat, shining, finely and closely punctured, and rather densely clothed with short yellow hairs, denser in a subcircular fringe about the margin of the front, extending about the base of the mandibles and between the sections of the eyes; the vertex and genæ with dense and minute punctulations and a few large, shallow punctures, almost glabrous; the eyes completely divided and surrounded by a narrow shining border; the epistomal margin raised, shining, and very broadly emarginate; the antennal funicle usually with six segments, the pedicel large, the club unsegmented, subacute at the tip, closely pubescent. The pronotum is two-thirds as long as wide; the caudal margin subtruncate, bisinuate, the sides on caudal half straight, slightly convergent, deeply, suddenly constricted in front of the middle, front margin broadly arcuate, feebly emarginate at middle line; closely finely granulate-punctate and clothed with short scale-like hairs; with a very fine indistinct median raised line.

The elytra are two and one-half times as long as wide; as wide as the pronotum at the base; the bases individually moderately arcuate, finely raised and crenulate, the striae very faintly indicated; the elytra closely, finely asperate-punctate, with a row of coarser asperities along each interspace and these larger asperities confused and numerous towards the base of the disc; the striae punctures with minute slender inconspicuous setæ; the numerous punctures of the interspaces with short, blunt, stout, scale-like hairs, with those from the row of coarser asperate punctures longer, particularly towards and upon the declivity and on the sides; so the pubescence is rather closely subscale-like, with a row of longer, lighter coloured, stout hairs on each interspace, and the finely asperate surface showing through.

THE MALE.—The male has the front convex above with two small approximate tubercles arranged transversely on the middle line; impressed cephalad of the tubercles; the pronotum usually shorter, and more deeply constricted in front.

VARIATIONS.—The size varies from 2 mm. to 3 mm. in length. The colour varies from piceous to nearly black. The front of the male has sometimes only one frontal tubercle and the anterior impression varies in depth. The most interesting variation is in the segmentation of the antennal funicle. This is typically six-segmented, with the second segment small and the distal segments widened. Not infrequently however, we find a reduction in the number. Two more common conditions are with four segments on the outer part of the funicle of which the second segment is partly divided by a deep suture, or with the second and third segments almost entirely fused. It is very evident that the segmentation of the antennal funicle is a variable character in this species, as in other allied species. This subject is further referred to under the Genus *Polygraphus*, Dom. Ent. Br., Bull. 14, Part 2.

This species is abundant throughout the spruce forests of Canada, from the Pacific Coast eastward to Newfoundland. It is rare in pine, and rather commonly found in larch.

About forty specimens were received in the bark of a section from a dead white spruce trunk collected by Mr. Johansen at Camp creek, below Sandstone rapids, Coppermine river, Northwest Territories, February. 15, 1915.

The tunnels of this species, associated with those of *Pityophthorus*, were numerous on the exposed wood surface of dead standing trees and beneath the patches of bark which remained, particularly on the upper portions of the trunk; numbers of dead adults were taken in the tunnels beneath these patches of bark. On the dead and dying parts of the living trees these *Polygraphus* and *Pityophthorus* tunnels were also found, but they were not so numerous here as on the old dead trees, and were not found at all in some of the dying branches and trunks examined. It was evident that cerambycid larvæ had been more injurious than bark-beetles during the season previous to the examination.

Genus *Pityophthorus* Eichh.

Eichhoff, Berl. Ent. Zeit., 8; 39, 45, 46, 1864.

Pityophthorus nitidus Sw.

Plate II, figures 3, 4, 5.

Swaine, Dom. Ent. Br., Dept. Agric. Bull. 14, pt. 1, p. 26, 1917.

DESCRIPTION OF THE FEMALE.—The length, 2.1 mm.; $2\frac{1}{2}$ times as long as the width; the elytral striæ not impressed, the stria punctures small; the declivity sulcate-retuse, not acuminate.

The head has the front flattened, the flat area bounded by a semi-circular line behind, very densely, minutely punctured and densely pubescent with short yellow hairs; the median carina nearly obsolete except the cephalic end which forms a rather prominent carinate tooth on the epistoma; the eyes rather finely granulate, deeply narrowly emarginate; the antennal club very wide, short oval almost subcircular, the sutures broadly arcuate the third most strongly, the first two segments each distinctly shorter than either of the last two; rather closely pubescent.

The pronotum is as long as wide; very broadly rounded behind, strongly arcuate on the sides behind; moderately constricted before the middle, broadly rounded on the front margin which is finely serrate, the asperities slightly stronger at the middle; the summit slightly in front of the middle with a wide transverse impression across the disc immediately behind the summit; finely subconcentrically asperate in front, rather coarsely, very densely, subgranulately punctured behind, the punctures smaller towards the lateral margins; with a small impunctuate spot on the middle of the side, and a smooth median space.

The elytra are slightly less than twice as long as the pronotum, 9:5, faintly narrower than the pronotum; truncate at the base; the sides subparallel for over two-thirds the length then narrowed and rather broadly rounded behind, very faintly sulcate-retuse as viewed from above; the upper part of the declivity distinctly sulcate-retuse; the sutural striæ finely impressed; the remaining striæ only very faintly indicated, except near the lateral margins the last two strongly impressed, especially behind; the stria punctures small, fairly close and deep, in only moderately regular rows; the interspaces not convex, sparsely uniseriately punctured in the interspaces of the disc, more closely punctured about the base and lateral margins; the ninth interspace moderately convex behind. The declivity is broadly sulcate above, the sulcus wide, not deep, not widened behind, shining, the sides feebly retuse, with a row of minute

granules on the suture and along the region of the third interspace; the whole declivity smooth and brightly shining, with the punctures extremely minute, hardly visible except towards the sides. The disc and the declivity are almost glabrous, with only minute very sparse pubescence; the pubescence about the lateral margins very short but distinct. The last sternite is rather deeply, broadly emarginate.

The male has the front flattened as before, but coarsely, fairly closely punctured with a well-developed median carina, and the pubescence almost invisible, the last ventral is emarginate as in the female.

Described from Quebec Province, Tullochgoram; *Picea canadensis*. Other localities: Ste. Annè de Bellevue, Que.; Truro, N.S.

About fifty specimens were received from the bark of a section of a dead white spruce trunk, collected by Mr. Johansen at "Camp creek," below Sandstone rapids, Coppermine river, Northwest Territories, February 15, 1915, in association with *Polygraphus rufipennis* Ky., page .

The Coppermine specimens are constantly somewhat larger than the typical form and the elytral striae are usually more finely punctured, but they are left for the present under *nitidus* Sw.

Genus **Pseudohylesinus** Swaine.

Dom. Ent. Br., Dept. Agric., Bull. 14; 11, 1917.

Pseudohylesinus tsugae Sw.

Latouche, Alaska, C.A.E., Sept. 13, 1916, F. Johansen, collector. One broken specimen, taken in hemlock bark, is doubtfully referred to this species.

OTHER NORTHERN RECORDS IN OUR COLLECTION.

Dendroctonus valens Lec.

Fort Chipewyan, Alta., June 13, 15, 1914, F. Harper, collector, 9 specimens.

Dryocoetes affaber Mannh.

Yukon Territories; lat. 62° 31'–63° 06' N., long. 137° 30'–139° 30' W., 1916; D. D. Cairnes, collector, 1 specimen.

Orthotomicus vicinus Lec.

Yukon Territories; lat. 62° 31'–63° 06' N., long. 137° 30'–139° 30' W., 1916; D. D. Cairnes, collector, 1 specimen.

Ips perturbatus Eichh.

Yukon Territories; lat. 62° 31'–63° 06' N., long. 137° 30'–139° 30' W., 1916; D. D. Cairnes, collector, 3 specimens, small Arctic race. This is probably the species referred to by Children* as *Bostrichus typographus*.

* Back's Overland Expedition, London, 1836, page 532.

Family CERAMBYCIDAE.

Only four species of this family were obtained in the extreme north including seven specimens in all.

Genus *Criocephalus* Muls.*Criocephalus agrestis* Kirby.

Fn. Bor. Am., IV, p. 140, 1837; Leconte, J. A. P., ser 2, 11, 36, 1850; Leng., Bull. Brooklyn Ent. Soc., VII, 64, 1884; Blatchley, Col. of Indiana, 1015, 1910.

One male from the Arctic coast; length, 2.1 cm., width 5.5 mm. at base of elytra, length of elytra 16.5 mm.; width of pronotum 4.5 mm.; length of pronotum 4 mm. The pronotal impressions moderate; the sides narrowly rounded, with only a few rugosities; punctuation close and minutely granulate. The elytra densely punctured and minutely granulate; the two costae rather strongly developed. More densely and coarsely granulate-punctuate than usual, but probably conspecific with the more southern forms.

Cape Bathurst, Northwest Territories, August 22, 1914, R. M. Anderson, collector, 886; crawling on beach, probably from driftwood which had come down the Mackenzie river or the Anderson river.

Other northern records: Rampart House, Yukon Territory (18 miles south), D. H. Nelles, collector, 9 specimens; 3 much smaller specimens from the same place may be distinct 14 mm. in length; slender, the pronotum subcircular from above, Dawson, Y.T., VIII, 1909, one specimen.

Genus *Merium* Kirby.*Merium proteus* Kirby.

Fn. Bor. Am. LV, p. 172, t.s.; f.s. 1837; Mannerheim, Bull. Mosc. III, 1853, 247; Leconte, J. A. P., ser. 2, II, p. 32; Leng, Bull. Brooklyn Ent. Soc., VII, p. 100, 1885; Blatchley, Col. of Indiana, p. 1019, 1910; Casey, Memoirs, III, 286, 1912.

Three dead specimens of this well known species were taken from the bark of dead white spruce. One specimen has only faint traces of the pale lines on the elytra; otherwise they need no description.

Coppermine river, below Sandstone rapids, Northwest Territories, February 17, 1915, F. Johansen, collector.

Other northern records: Fort Cudahy, Yukon Territory, August 25, 1896, W. Ogilvie, collector, 3 specimens; Dawson, Yukon Territory, May 17, 1908, 1 specimen.

Genus *Neoclytus* Thomson.*Neoclytus muricatus* Kirby.

Fn. Bor. Am., IV, p. 177, 1837; Leng, Ent. Am., III, 8; Wickham, Can. Ent., XXIX, p. 152, 1897.

Length, 9 mm.; width, 2.5 mm.; brown with grayish white markings; the pronotum as wide as long.

Below Sandstone rapids, Coppermine river, Northwest Territories, February 15, 1915, F. Johansen, collector; one specimen, taken from the pupal cell in small limb of white spruce.

The tunnels of *Neoclytus muricatus* are numerous on a short dead branch from a living tree. Part of the bark had fallen; the branch had been dead for

at least a year; and some of the tunnels were evidently several years old. The tunnels of this species are slender, elongate, winding, more or less longitudinal upon the surface, scoring the wood, then entering the wood through an oval hole to continue below the surface for two or three inches. The pupal period is passed in this tunnel and the adult emerges eventually through a round exit hole. The larvæ of this species had evidently been heavily parasitized, for many empty cocoons of a hymenopterous parasite were attached to the tunnels beneath the bark. One dead adult beetle was found in an exit tunnel just below the wood surface.

Genus *Xylotrechus* Chev.

Xylotrechus undulatus Say.

Long's Expedition, II, p. 291, 1820; Leng, Ent. Am., II, p. 200.

Length of the elytra, 1 cm.; width of pronotum, 4 mm.; length of pronotum, 3.5 mm.; colour dark brown with the transverse markings yellowish white; pronotum with apical band interrupted only at median line, caudal band feebly indicated on the sides, sides of pronotum grayish from superimposed fine gray hairs; elytra with basal line feeble, discal spot strong, median transverse line strong and continued along the suture and side margin forward nearly to the base. The subapical transverse line strong *complete* (this line almost invariably interrupted in the middle in our collection of over 60 specimens) apical marking strong; longitudinal grayish tracings very faint. One specimen below Sandstone rapids, Coppermine river, Northwest Territories, February 15, 1915; F. Johansen, collector.

One specimen was removed in fragments from tunnels in the wood of a white spruce; it had been working in a dead patch on a living tree. A second specimen found in the same stick is lighter brown, and lacks the longitudinal grayish markings.

Cerambycid tunnels which may be those of *Xylotrechus undulatus* are numerous in a part of a branch dying at the time of collection. The surface tunnels are wide and flat, scoring the wood, and filled with frass, freely winding, and very irregular in width. They eventually enter the wood through an oval hole, penetrate to the centre of the branch and continue longitudinally for about two inches. In this last portion the larvæ pass the winter. There were no exit holes.

Monochamus tunnels, probably those of *scutellatus*, were on the large stick. Two larvæ had entered the wood but neither of them emerged. There were no adults in the collection.

OTHER NORTHERN RECORDS IN OUR COLLECTION.

Monochamus scutellatus Say.

Fort Cudahy, Yukon Territory, 25-VIII-96, W. Ogilvie, collector, 1 ♂, 1 ♀; Upper Stewart river, Yukon Territory, Jos. Keele, collector, 1881, 1905, 1 ♀; Rampart House (18 miles south), Yukon Territory, D. A. Nelles collector; Yukon Territory, lat. 62° 31' to 63° 06' N., long. 137° 20' to 129° 30' W., 2 ♂'s, D. D. Cairnes, collector; Fort Chipewyan, Alta., June 23, 1914, Harper, collector; Hudson bay, 1887, J. M. Macoun, collector, 2 ♀'s.

Pachyta liturata Ky.

Dawson, Yukon Territory.

***Acmaeops proteus* Ky.**

Yukon Territory; lat. $62^{\circ} 31' - 63^{\circ} 06' N.$; long. $137^{\circ} 30' - 139^{\circ} 30' W.$, 1913; D. D. Cairnes, collector, 6 specimens.

***Acmaeops pratensis* Laich.**

Yukon Territory, latitude and longitude as above; 1916, D. D. Cairnes, collector, 1 specimen. Near Sixtymile river, along meridian $141^{\circ} W.$, 1907, T. P. Reilly, collector, 1 specimen. Rampart House (18 miles south), Yukon Territory, D. H. Nelles, collector, 1 specimen. Fort Cudahy, Yukon Territory, 25, VIII, 1896, W. Ogilvie, collector, 2 specimens.

Genus *Callidium* Fabr.***Callidium subopacum*, n. sp.**

Length, 9 mm.: body piceous, above dull greenish, antennæ reddish except first segment very slender; above subopaque; head rather obscurely punctured and reticulate, punctures coarser and more distinct behind; median line finely impressed, a wide transverse impression between the eyes; the pronotum much wider than long, nearly as wide as the elytra, widest about the middle, the sides broadly arcuately narrowed in front and more strongly narrowed behind the middle, the sides spongy from exceeding by dense, very deep, subcircular, margined punctures, with rather numerous long brownish hairs, a median amphora-shaped area impressed, the margins rather indefinite, nearly smooth, finely reticulate, the punctures coarse but very shallow, the pubescence red, short and erect, longer in front; the elytra thin, coarsely irregularly punctured, margins of the punctures indefinite, with minute setose punctures in their depth, these feebly granulate only towards the base.

Type, south of Rampart House, Yukon Territory, D. H. Nelles, collector; one paratype, same labels. Two other allied undescribed species are in our collection from southern British Columbia.

***Tetropium cinnamopterum* Ky.**

Fort Cudahy, Yukon Territory, 25-VIII-96, W. Ogilvie, collector. 4 specimens.

Length, 9-10 mm.; slender, piceous below, head and pronotum black, elytra smoky brown; pronotum subangularly rounded on sides, closely punctured and granulate on the sides, smooth, shining, and very sparsely punctured over nearly whole of disc, with a broad and strong anterior impression; the antennæ rather slender.

FAMILY BUPRESTIDAE.

Only one specimen of this Family was included in the collection:

***Melanophila longipes* Say.**

Near Langton bay, Northwest Territories, 1910-11, R. M. Anderson, collector, 1632.

Other northern records in our collection: Near Sixtymile river, along 141^{st} meridian, Yukon Territory, 1907. T. P. Reilly, collector, 1 specimen; Stewart river, Yukon Territory, 1909, D. H. Nelles, collector, 1 specimen.

Occurs throughout Canadian forests from Nova Scotia to British Columbia and the Yukon.

RECORDS OF OTHER NORTHERN SPECIES IN OUR COLLECTION.

Melanophila drummondi Kirby.

Yukon Territory, lat. $62^{\circ} 31' - 63^{\circ} 06'$, long. $137^{\circ} 30' - 139^{\circ} 30'$, 1916, D. D. Cairnes, collector; near Sixtymile river, along 141st meridian, Yukon Territory, 1907, T. P. Reilly, collector, 2 specimens. Abundant throughout British Columbia, extending south into the United States and northward into the Yukon and Alaska. I have taken a series of thirteen near Lesser Slave lake in Alberta, and rarely in the east (Fort Coulonge, Que., in *Pinus strobus*).

Chrysobothris trinervia Kirby.

Near Sixtymile river, along 141st Meridian, Yukon Territory, 1907, Thos. P. Reilly, collector, 1 specimen.

There are two specimens in our collection from Fort Yukon, Alaska. Represented in our collection from Halifax, N.S., across Canada to Alaska and the Yukon.

Buprestis nuttalli Kirby.

Stewart river, Yukon Territory, 1909, D. H. Nelles, collector, 1 specimen.

There are only two small reddish-yellow spots on each elytron and the posterior of these almost obsolete on the right side; the spots on the outer faint but distinct on abdominal segments and coxae. Represented in our collections from Quebec, Ontario, Alberta, southern British Columbia, Alaska, and the Yukon.

Dicerca prolongata Lec.

Fort Chipewyan, Alta., 15-VI-1914, lake Athabaska, Alta., near shore on portage to lake One, 29-VI-14, F. Harper, collector, 1 specimen.

Dicerca tenebrica Ky.

Stewart river, Yukon Territory, D. H. Nelles, collector, 1909; Yukon Territory, latitude $62^{\circ} 31' - 63^{\circ} 06' N.$, long. $137^{\circ} 30' - 139^{\circ} 30' W.$, D. D. Cairnes, collector; lake Athabasca, Alta., near shore on portage to lake One, 29-VI-14, F. Harper, collector, 1 specimen; Dawson, Yukon Territory, 20-VI-08, 1 specimen.

Poecilnota, undes. sp.

Stewart river, Yukon Territory, D. H. Nelles, collector, 1909.

Length, 17 mm.; black above, eyes red, venter black with coppery reflections, apparently distinct, 1 specimen.

Family **CARABIDAE.**

By H. C. FALL.

Of the Carabidae collected by the Canadian Arctic Expedition, a representative lot of 206 specimens has been sent me for identification by Dr. C. Gordon Hewitt, Dominion Entomologist. The number of species in the lot is not large—about fifteen—but of some of them considerable series were evidently taken, only a part of which were submitted.

The chief difficulty encountered in determining any collection of Arctic Carabidae, centers in that complex of small Pterostichi belonging to the subgenus *Cryptobius*, which constitute so characteristic a feature of the Carabid fauna of those regions. The species are numerous, but are still very imperfectly known and to a great extent opinionative, and are not satisfactorily determined in any American collection. Their identification therefore in the following list must for the present be regarded as tentative.

Genus **Carabus** Linn.**Carabus chamissonis** Fisch.

Langton bay (Franklin bay), Northwest Territories, summer, 1911, R. M. Anderson, collector, 1♀; cape Barrow, Coronation gulf, Northwest Territories, August 4, 1915, J. J. O'Neill, collector, 1♂, 1♀.

Genus **Elaphrus** Fab.**Elaphrus riparius** var. **gratiosus** Mann.

Teller, Alaska; July 31, 1913, F. Johansen, collector, two examples in badly damaged condition.

Genus **Nebria** Lat.

A single female of this genus was collected which cannot well be referred to any species thus far recorded from the American continent. It seems in most respects nearest to *obliqua* and *suturalis*, but, unlike them, has elytral interspaces 3.5.7. punctuate. It bears the label—Collinson point, Alaska, May 9, 1914, D. Jenness, collector.¹

Genus **Pelophila**.**Pelophila eschscholtzii** Mann.

Teller, Alaska, July 29, 1913, F. Johansen, collector. A single specimen in poor condition.

¹This specimen was submitted to Dr. E. C. Van Dyke for examination and he believes that it is a black-legged variety of *bifaria*, the typical forms with red legs being found in the Lower Yukon Valley.

Genus Asaphidion (Tachypus of our lists.)

West of Collinson point, Alaska, June 12, 1914; F. Johansen, collector. A single sample, which, judging from the description, can hardly be *T. elongatus*, the only recorded American species.

Genus Bembidium Latr.**Bembidium complanulum Mann.**

Nome, Alaska, August 21-24, 1916. F. Johansen, collector, 1 specimen.

Genus Pterostichus Bon.**Pterostichus agonus Horn.**

Seven examples—all ♀'s from the following localities: Konganevik, Camden bay, Alaska, June 27, 1914, F. Johansen, collector; Collinson point, Alaska, September 27, 1913, and June 1, 1914, F. Johansen, collector; Barter island, Arctic coast of Alaska, June 11, 1914, D. Jenness, collector; Demarcation point, Alaska, May 20, 1914, F. Johansen, collector; Langton bay (Franklin bay), Northwest Territories, summer, 1911, V. Stefánsson, collector.

Horn's statement that the elytral striae are fine, and the intervals flat, does not apply very well to any of these examples, nor to a specimen in my collection taken by Dr. F. E. Blaisdell at Nome, Alaska. The unique type was from the Yukon river, Alaska.

Pterostichus vindicatus Mann.

Nome, Alaska, August 21 to 24, 1916, F. Johansen, collector; Teller, Alaska, July 24, 1913, F. Johansen, collector.

Pterostichus sp., near the preceding.

Konganevik, Camden bay, Alaska, June, 1914; Demarcation point, Alaska, May 16, 1914; Bernard harbour, Northwest Territories, June 20, 1916; all collected by F. Johansen.

Pterostichus hyperboreus Mann.

Langton bay (Franklin bay), Northwest Territories, summer 1911, V. Stefánsson, collector, 3♂'s, 1♀.

Pterostichus similis Men.

Teller, Alaska, July 24, 1913; F. Johansen, collector.

Pterostichus mandibularis Kby.

Konganevik, Camden bay, Alaska, June 27, 1914; Collinson point, Alaska, September 22 and 27, 1913; Boundary Zone, Demarcation point, Arctic Alaska and Yukon, May 6, 1914; Demarcation point, Alaska, May 14-20, 1914; Cock-

burn point, Dolphin and Union strait, September 7, 1914; Bernard harbour, Dolphin and Union strait, Northwest Territories, June 15, 2 specimens, June 20, 1916, 1 specimen. All collected by F. Johansen. The specimens from the last two named localities have the hind angles of the thorax more obtuse and perhaps represent a distinct species; some variation in this respect however is noticeable among the others.

Genus *Amara* Bon.

Amara haematopa Dej. (similis Kby.)

Bernard harbour, Northwest Territories, May 22, 1915; June 20, 1916; July 9, 1916; 2♂'s, 3♀'s; F. Johansen, collector.

Of these specimens 1♂ and 2♀'s are quite black, 1♂ metallic, the third with faintly greenish elytra. The general form of body is quite like that of *Pterostichus agilis* and it seems not to have been observed by Horn that the penultimate joint of the labial palpus is bisetose in front as in *Pterostichus*, not plurisetose as in the rest of the *Amara*.

Amara brunnilpennis Dej.

The material sent me contains ninety-three samples of this common and widespread boreal species. The following localities are represented, all specimens collected by F. Johansen unless otherwise stated. Nome, Alaska, August 24-25, 1916; Konganevik, Camden bay, Alaska, June 27, 1914; west of Collinson point, Alaska, June 12, 1914, E. deK. Leffingwell, collector; Langton bay (Franklin bay), Northwest Territories, summer of 1911, V. Stefánsson, collector; Cockburn point, Dolphin and Union strait, Northwest Territories, September 7 and 26, 1914; Bernard harbour, Northwest Territories, May 18-September 1, 1915, and 1916; Kugalik river, Wollaston peninsula, Victoria island, August 18, 1915, D. Jenness, collector. Probably Armstrong point, west side of Victoria island, June, 1916, J. Hadley, collector.

Amara glacialis Mann.

Cockburn point, Dolphin and Union strait, Northwest Territories, August 30 and September 7, 1914, twelve ♂'s, eleven ♀'s; Bernard harbour, Northwest Territories, June and July, 1915 and 1916, sixteen ♂'s, nine ♀'s; all collected by F. Johansen.

Lebia (?) sp.

Bernard harbour, Northwest Territories, May 2, 1915, F. Johansen, collector. A mere wreck with dorsum of thorax and all appendages missing. Evidently found in this condition and perhaps not an inhabitant of the region explored. It does not appear to be identical with any of our American species of this genus, none of which have ever been reported from so far north.

Family SILPHIDAE.

Genus *Silpha* Linn.

Silpha lapponica Hbst.

Konganevik, Camden bay, Alaska, July 4, 1914, F. Johansen, collector; Nos. 175-6; Port Epworth, Coronation gulf, July 15, 1915 (on dried fish), Nos. 123-7, J. J. O'Neill, collector; Kogluktuaik river (Tree river), Coronation gulf, Northwest Territories, July 1915, J. J. O'Neill, collector, No. 106.

Family **COCCINELLIDAE.**

By CHAS. W. LENG.

Genus **Coccinella** Linn.**Coccinella quinquenotata** Kirby.

Langton bay, Northwest Territories, 1910-11, No. 1630, R. M. Anderson, collector.

Coccinella nugatoria Mulsant.

Langton bay (Franklin bay), Northwest Territories, summer 1911, No. 1865, V. Stefánsson, collector; Kater point, Bathurst inlet, Northwest Territories, August 24, 1915, J. J. O'Neill, collector, No. 109.

Both of these species are closely related to *Coccinella transversoguttata* Fabricius, a species widely distributed in the northern parts of both hemispheres, the larva feeding on aphids.

Family **ELATERIDAE.**

By C. W. LENG.

Genus **Hypnoidus** Steph.**Hypnoidus barbatus** Sahlb.

Nome, Alaska, F. Johansen, collector, August 24-25, 1916; Nos. 21, 22.

Family **CHRYSOMELIDAE.**

By C. W. LENG.

Genus **Chrysomela** Linn.**Chrysomela subsulcata** Mann.

Tundra plateau, Konganevik, Camden bay, Alaska, July 1, 1914, No. 431; tundra at Konganevik, Camden bay, Alaska, June or July, 1914, No. 436; Konganevik, Camden bay, Alaska, June 27, 1914, No. 458; under old driftwood logs in tundra behind house at Collinson point, Alaskan Arctic coast, September 27, 1913, Nos. 1151, 1152; Collinson point, Alaska, June 18, 1914, No. 1171; Collinson point, Alaska, September 2, 1914; tundra east of Collinson point, Alaska, September 2, 1914, No. 1642. The last one was collected as larva June 18, 1914, and pupated July 13, 1914 (breeding record 8). All collected by F. Johansen.

Genus **Lina** Meg.**Lina scripta** Linn.

Collected as pupæ September 10, 1916, on *Alnus* leaves and reared (breeding record 135). Ketchikan, Alaska, September 16-20, 1916, F. Johansen, collector, Nos. 1211 to 1213.

Genus **Galerucella** Crotch.**Galerucella decora** Say.

Langton bay (Franklin bay), Northwest Territories, 1910-11, V. Stefánsson and R. M. Anderson, collectors; Nos. 1700 to 1704 and 1698 to 1699.

Genus **Haltica** Geoff.**Haltica bimarginata** Say.

Langton bay, Northwest Territories, V. Stefánsson and R. M. Anderson, collectors, 1910-11; No. 1631.

Family **DYTISCIDAE**.

By J. D. SHERMAN, JR.

Genus **Hydroporus** Clairv.**Hydroporus humeralis** Aubé.

Teller, Alaska, August, 1913, two specimens; Konganevik, Camden bay, Alaska, June, 1914, three specimens; Demarcation point, Alaska, May, 1914, five specimens; Bernard harbour, Northwest Territories, June, July, six specimens. All collected by F. Johansen. A common, variable, Pacific coast species.

Hydroporus tartaricus Lec.

Collinson point, Alaska, September, 1913, seven specimens; Demarcation point, Alaska, May, 1914, five specimens; Bernard harbour, Northwest Territories, May to August, five specimens; all collected by F. Johansen.

Hydroporus sp. (Perhaps **tristis** Payk.)

Bernard harbour, Northwest Territories, May, July, F. Johansen; two specimens.

Genus **Coelambus** Thom.**Coelambus unguicularis** Cr.

Bernard harbour, Northwest Territories, June, F. Johansen, collector; four specimens.

Genus **Ilybius** Er.**Ilybius angustior** Gyll.

Teller, Alaska, August 1913, F. Johansen, collector; two specimens. Extremely common in Labrador.

Genus *Agabus* Leach*Agabus nigripalpis* Sahlb.

Teller, Alaska, August 1913, one specimen, F. Johansen, collector; Collinson point, Alaska, September 1913, six specimens, F. Johansen, collector; Barter island, Alaska, July 1914, one specimen, D. Jenness, collector; Demarection point, Alaska, May 1914, two specimens, F. Johansen, collector; Bernard harbour, Northwest Territories, May to August, forty-two specimens, F. Johansen, collector; Colville mountains, Wollaston peninsula, Victoria island, July 1914, one specimen, D. Jenness, collector.

This variable species, taken by R. Bell at Stupart's bay and cape Digges, Hudson strait, was regarded by Dr. Sharp as probably a variety of *Agabus congener* Payk.

Agabus infuscatus Aube.

A single specimen; Teller, Alaska, July 29, 1913; F. Johansen, collector. Very common at some points in Labrador.

Agabus obsoletus Lec.

Collinson point, Alaska, September 1913; F. Johansen, collector, two specimens.

Described from San Diego, California. I have a large series from Oregon (Corvallis and Gaston).

Genus *Colymbetes* Clairv.*Colymbetes dolobratus* Payk.

Teller, Alaska, July 1913, F. Johansen, collector, two specimens; Bernard harbour, Northwest Territories, May to July, F. Johansen, collector, seven specimens. An Alaskan and Siberian species.

III. RHYNCHOPHORA (excl. IPIDAE).

By CHAS. W. LENG.

Genus *Lepyrus* Germ.

The species of *Lepyrus* inhabit the northern parts of both hemispheres, extending southward in America to the White mountains of New Hampshire, the swamps of Genesee county, New York, Michigan, Wisconsin, and Colorado. The larvæ live in willows and aspens.

Lepyrus gemellus Kirby.

Langton bay (Franklin bay), Northwest Territories, V. Stefánsson, collector, summer 1911; No. 1687.

Lepyrus capucinus Schall.

Langton bay (Franklin bay), Northwest Territories, V. Stefánsson, collector, summer 1911; Nos. 1671-3.

Lepyrus palustris Scopoli.

Bernard harbour, Northwest Territories, June 4, 1916, F. Johansen, collector; No. 1634.

Genus **Stephanocleonus** Motsch.**Stephanocleonus plumbeus** Leconte.

Bernard harbour, Northwest Territories, July 6-7, 1915, F. Johansen, collector; No. 1249.

Described from the northern shore of Lake Superior; an uncommon species recorded from Telegraph creek, British Columbia, and from Maine, Connecticut, Colorado, and New Mexico.

Genus **Trichalophus** Lec.**Trichalophus stefanssoni**, n. sp.

Oblong-oval, black, thickly clothed above and beneath with short, white, decumbent hairs, sometimes condensed into vaguely defined spots on the elytra and an oblique line at each side of disc of thorax. Beak finely carinate, slightly dilated at apex, antennal groove deep, almost reaching the eye; scape of antennæ almost reaching the eye, funicle seven-jointed, first two joints each longer than the succeeding bead-like joints, club three-jointed, oval, pointed, annulated. Eyes oval, transverse, finely granulated. Head slightly protuberant between and above the eyes. Thorax slightly longer than wide, slightly constricted and narrower in front; surface uneven, a complete median carina with a minute polished tubercle each side thereof being the most conspicuous interruptions of the surface. Elytra oval, convex, with feeble numeral angles, surface irregularly interrupted and tending to form rows of small tubercular elevations. The surface is very minutely punctulate between the elevations, visible only by removing the hairs. Front coxæ contiguous, prominent; middle coxæ separated by less than half their width; also prominent; hind coxæ widely separated, not prominent first again longer, oval at tip. Femora slightly incrassate, tibiae excavated at apex, with spinulose fringe and a conspicuous spine; tarsi broad, pubescent beneath, third joint divided, claws simple. Resembles in many respects *Trichalophus didymus* Leconte from Vancouver, British Columbia and Colorado, but differs in the shorter antennæ, the carination of the beak, the size and obscure maculation.

Length, including beak, 10-12 mm.; width, at middle of the elytra, 3.5-5.0 mm.

Bernard harbour, (Cockburn point), Northwest Territories; September 26, 1914, F. Johansen, collector, Nos. 919-927; May 22, 1915, F. Johansen, collector, Nos. 929 to 935; July 6, 7, 1915, F. Johansen, collector, No. 1251; June and September, 1916¹, F. Johansen, collector, Nos. 268, 269; July 10, 1916, F. Johansen, collector, Nos. 267, 218; cape Krusenstern, Northwest Territories, July 1916, D. Jenness, collector, No. 292.

No. 929 is designated as the type and is in the National Museum, Ottawa, as well as the other specimens named except No. 925 which is in my own collection.

No. 107, Kogluktualuk river, Coronation gulf, Northwest Territories, July 1915, J. J. O'Neill, collector, differs from the above only by the brownish colour of the hairs, possibly as the result of accidental staining.

¹The one that emerged in September 1916, was collected as a larva June 20, 1916, and pupated August 8, 1916. (Breeding-record 122).

No. 167, Langton bay (Franklin bay), Northwest Territories, summer 1911, V. Stefánsson, collector, is another aberrant specimen, partly denuded, with brownish hairs.

No. 747, Bernard harbour, Northwest Territories, July 17, 1915, F. Johansen, collector, is another still more difficult specimen to place, for it is almost entirely denuded and looks therefore quite different. It is however, the same species as those described above and exhibits actual sculpture of the surface, which is scabrous throughout except that on the front part of the thorax it becomes evidently distinctly punctate.

The tribe Alphini, to which the species described above belongs is represented by numerous species in Siberia. I have tried to identify this species with one of them without success; and as most of the described species occur in the region of Lake Baikal, while it is in northeastern Siberia that the fauna more nearly resembles that of America, it seems probable that it has heretofore escaped discovery, though evidently abundant in the Canadian Arctic Region.

Genus **Sitona** Germ.

Sitona discoidea Gyllenhal (?).

Bernard harbour, Northwest Territories, July 6, 7, 1915; F. Johansen, collector, No. 1248.

The condition of the single specimen of this species makes an exact identification impossible.





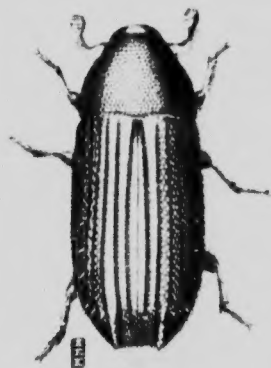
PLATE I. White spruce forest on the Coppermine river, Northwest Territories, below Sandstone rapids, showing also scrub willows; February 15, 1915, F. Johansen, Photo.

EXPLANATION OF PLATE II.

PLATE I. Bark-beetles.

- Fig. 1. *Carphoborus andersoni* Sw.
Fig. 2. *Polygraphus rufipennis* V.
Fig. 3. *Pityophthorus nitid*
Fig. 4. *Pityophthorus nitid* Sw., declivity of elytra.
Fig. 5. *Pityophthorus nitidus* Sw.
Fig. 6. *Denacotanus johansen* Sw.

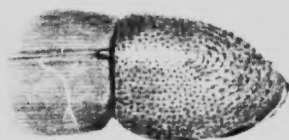
The drawings are by Mr. A. E. Kellett, Artist Assistant, Entomological Branch, Department of Agriculture, Ottawa.



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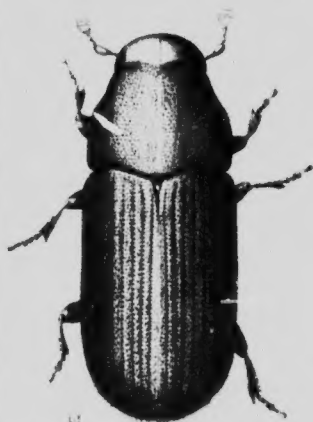
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EXPLANATION OF PLATE III.

PLATE 2. Spruce from Coppermine River forest, below Sandstone rapids.

- Fig. 1. Section showing work of *Polygraphus rufipennis* Ky., beneath the bark.
- Fig. 2. Spruce branch showing tunnels of *Carphoborus andersoni* Sw.
- Fig. 3. Spruce branch showing tunnels of *Xylotrechus undulatus* and *Neoclytus muricatus*.
- Fig. 4. Same as figure 3, the reverse side.



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